2 Sheets--Sheet 1.

J. H. GUEST.

Thermostats and Thermostatic-Alarms.

No. 150,566. Patented May 5, 1874.

Fig. 1.

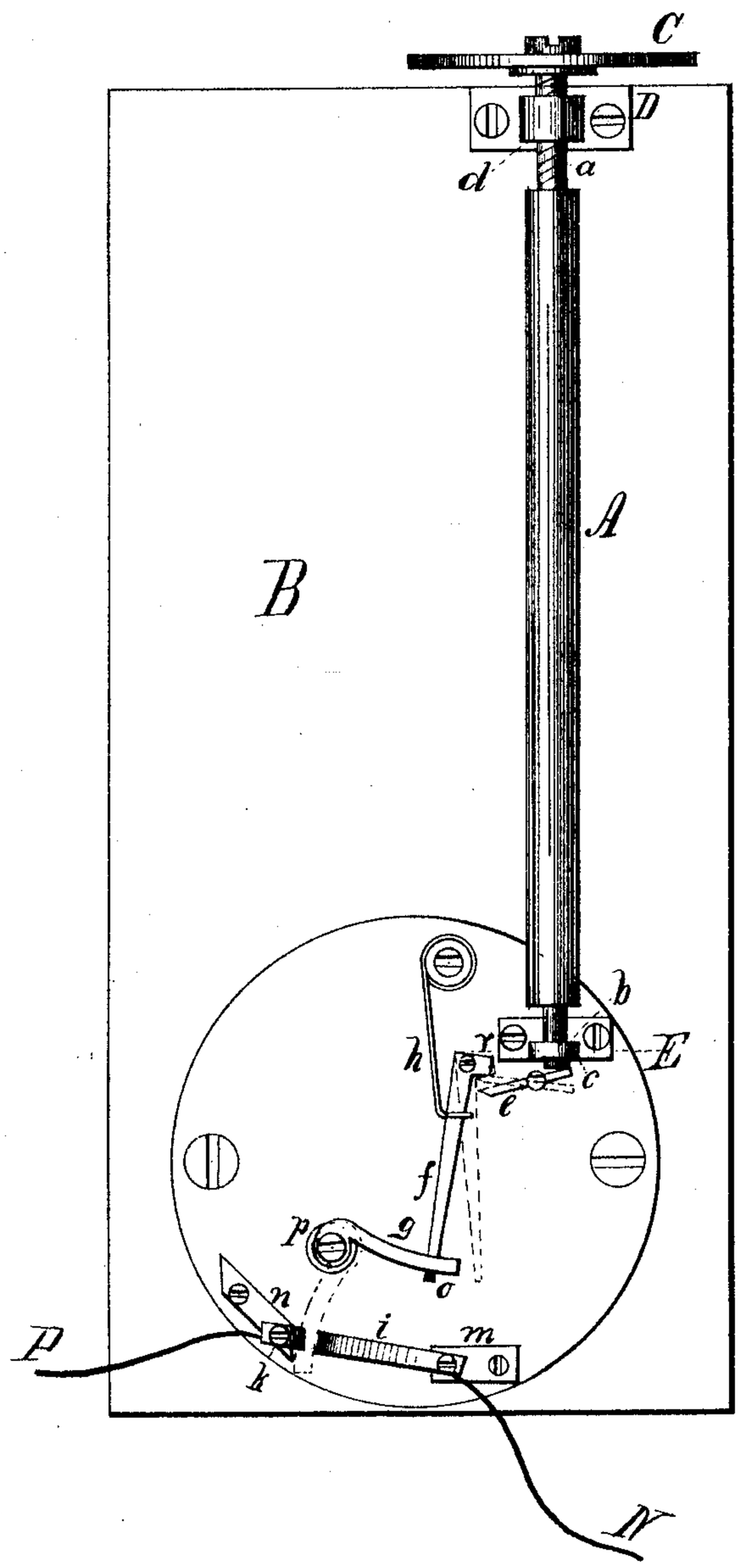

Fig. 2.

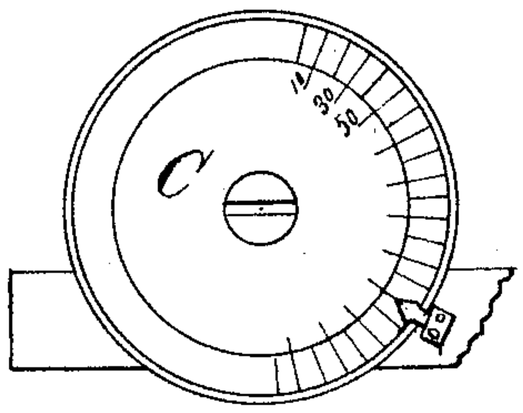

Fig. 3.

WITNESSES=

W. E. Chaffee
C. Hathaway

INVENTOR_

L. H. Guest

J. H. GUEST.
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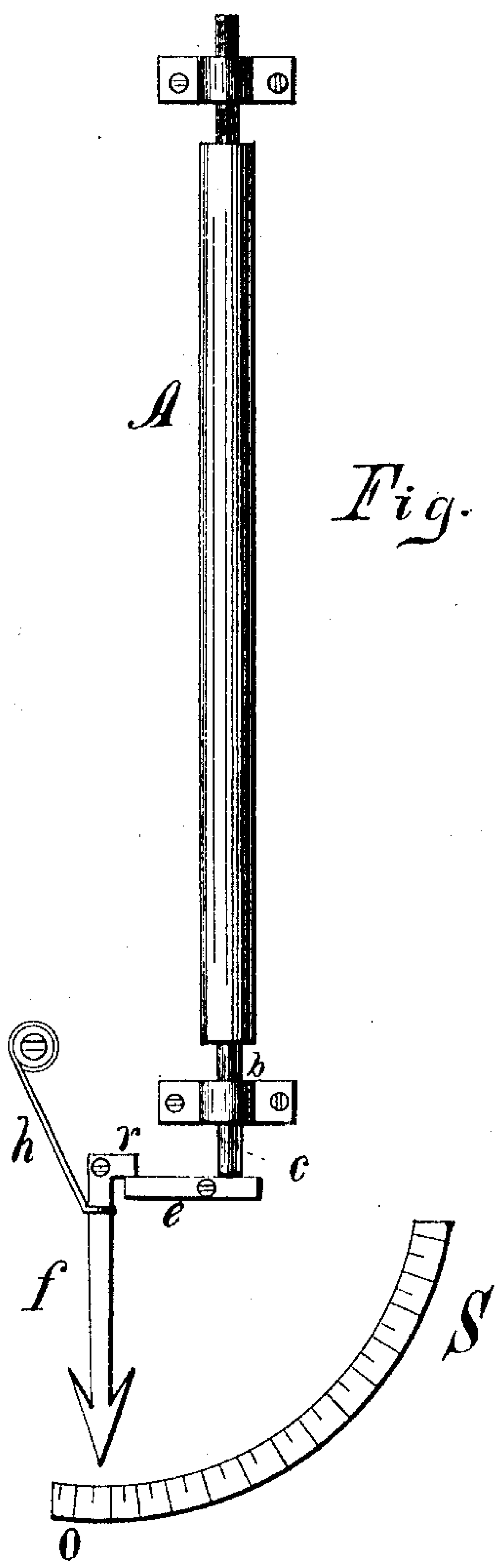

Fig. 4.

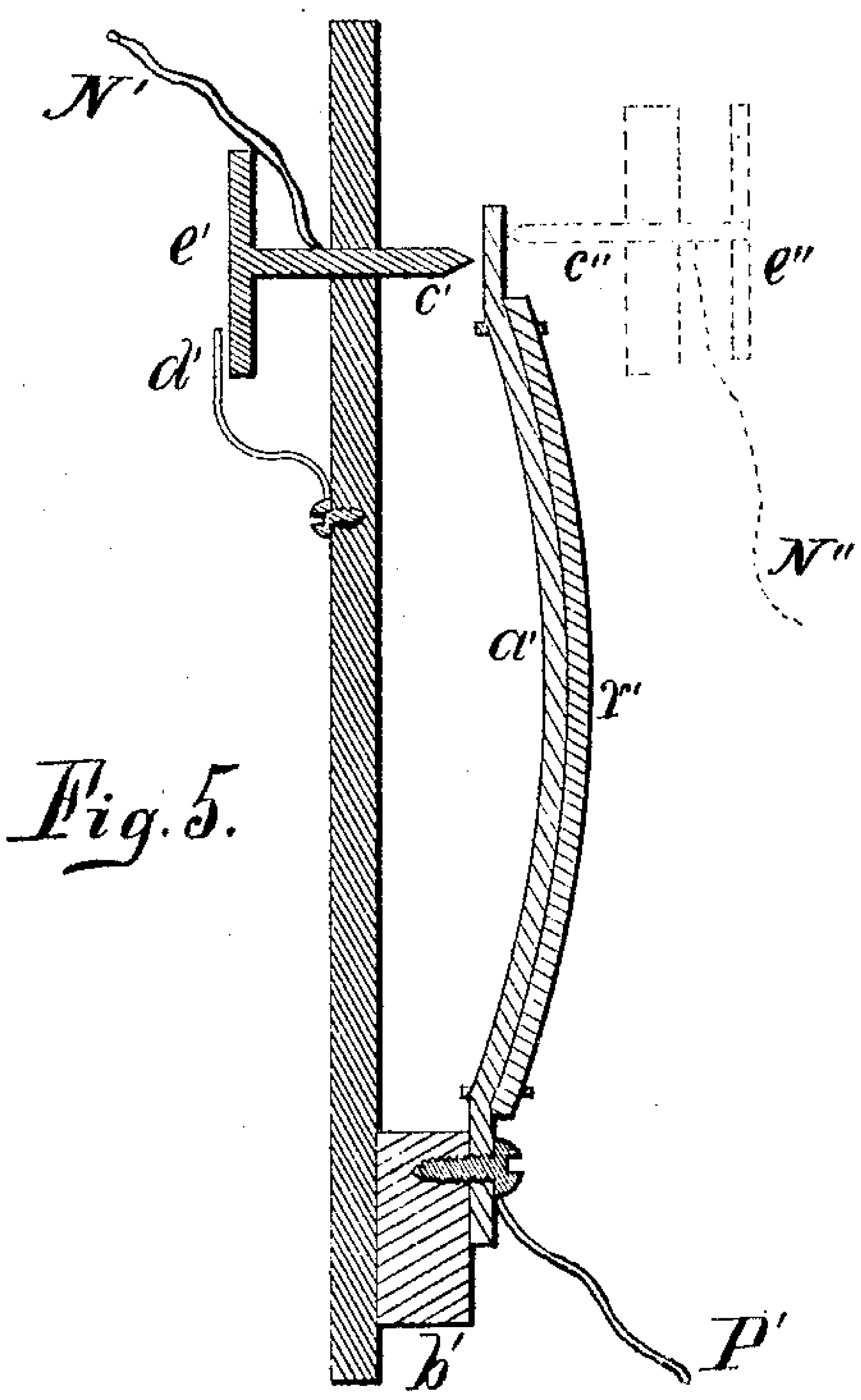

Fig. 5.

WITNESSES=

W. E. Chaffee
C. Hannaway

INVENTOR

J. H. Guest.

UNITED STATES PATENT OFFICE.

JOHN H. GUEST, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN THERMOSTATS AND THERMOSTATIC ALARMS.

Specification forming part of Letters Patent No. **150,566**, dated May 5, 1874; application filed March 14, 1874.

To all whom it may concern:

Be it known that I, JOHN H. GUEST, of the city of Brooklyn, Kings county, State of New York, have invented certain new and useful Improvements in Thermostats and Thermostatic Alarms, of which the following is a specification:

My invention relates to that class of thermostats wherein the expansion of a body caused by heat is utilized to give an automatic indication or alarm whenever the heat shall rise to some determinate degree; and it consists, primarily, in constructing the thermal bars so that they shall act directly on alarm or indicating devices by lineal expansion; and, further, in making the thermal bar of india-rubber or some other equivalent non-metalic solid element, the term solid being used in contradistinction to liquid; and, further, in the devices and combinations more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part of this specification.

In the drawings, Figure 1 is a plan view of a device embodying my invention; Fig. 2, an end view of C and the index pointer; and Fig. 3 a modification of the thermal bar A.

A is the thermal or expansive bar, having the screw-thread extremity *a* taking into the screw-thread bracket or support *d* projecting from the base D thereof. At its other end is the smooth prolongation *b*, capable of sliding easily through the support or bracket *c* of the base-piece E, the outer end of *b* passing through *c* and retaining the lever *e*, pivoted as shown. The outer end of this lever *e* takes under the short arm *r* of a bent lever, *f*, pivoted as shown. Upon the end of the long arm of lever *e* is a stop, *o*, bent upwardly at right angles, holding a trigger or detent, *g*, in the position shown. By a spring, *h*, the lever *f* is caused to normally assume the position shown in full lines in Fig. 1, while, by spring *p*, the trigger *g* is caused to take the position shown in dotted lines whenever the stop *o* is withdrawn from it.

From this description the operation of the thermal bar upon the trigger *g* is easily seen—viz., that whenever lineal expansion takes place in the thermal bar A, its upper end being rigidly fixed to D by the screw-threaded shank *a* and support *d*, such expansion acts directly and entirely upon the lever *e*, and through it upon *f*, causing them to assume the position shown in dotted lines, and releasing *g*. *g* may be the trigger or detent of any suitable alarm apparatus, releasing a wound-up signal apparatus, or winding up a signal apparatus by its movement; or it may be simply a circuit, closing or breaking, serving to separate or bring together the two springs *i* and *k* attached to insulating-blocks *m m*, and which springs form the terminals of a battery-circuit, as represented by the wires P N, in which circuit is placed any suitable electric apparatus.

As all these methods of application are within the skill of any one versed in the art, I have not herein elaborated them, nor do I confine myself to them in the practical application of my invention.

Upon the end of the thermal bar is fixed a graduated dial or disk, C; and upon the end of any suitable base, B, upon which the parts are secured, is fixed a pivot, *o*. Upon revolving C the thermal bar A is revolved, and by means of the screw-threaded shank *a* the end *b* is forced farther in or partially withdrawn through *b*, thus taking a greater or less degree of expansion to operate the levers *e* and *f*. The graduations are marked on C, so that by turning it till any particular graduation is under index *o*, the apparatus is set to go off when the temperature of the air surrounding the apparatus reaches such degree.

It is evident that the form of this index may be varied; for instance, the degree may be marked on the bar and an index-finger attached to the base, and vice versa.

I propose to use this thermostat also as a thermometer, either separately or in connection with the alarm-giving devices shown in Fig. 1. Fig. 4 shows one plan of doing this, wherein the lever *f*, pivoted with a pointer, sweeps over the graduated scale S, indicating the temperature.

It is evident that two levers may be arranged on the same or different pivots, to be acted on by the same thermal bars, one to release the mechanism and the other to mark the temperature.

The thermal bars I use are made of solid or

hollow cylinders, arranged to act directly by lineal expansion. I find this form preferable to those formed of metals having different rates of expansion, and acting by a curving consequent on such different degrees of expansion. These bars may be of one metal, or several metals may be used, the sections being joined end to end, as in Fig. 4, where A may be copper, or zinc, or rubber, as hereafter set forth, or one section, *y*, may be one metal, and *z* another, or *y* or *z* rubber, and the other a metal.

I have discovered that excellent results may be obtained by the use of rubber or other non-metallic solid in this connection. I find rubber to be very susceptible to changes in temperature, and that its rate of expansion and contraction for the same degrees is constant, no matter how often used. These are points of great utility, and I believe I am the first to ever utilize this class of solids for thermostatic alarms, it having been hitherto considered that metallic substances were indispensable therefor.

In Fig. 1 the thermal bar is shown solid. Where a very quick result is desired I prefer to make them hollow, with apertures bored through, as shown in Fig. 3, allowing the heat full play upon both the interior and exterior of the bar. These forms are used with either the rubber or metal, or the combined rubber and metal, or the compound metal forms.

Another method of using rubber in this connection is shown in Fig. 5, in which *r'* and *a'* are strips of any suitable metal and rubber, firmly riveted or otherwise fastened together, and attached to an insulating-block, *b'*, *c'* being a contact-point having dial or index at *c'*, *d'* being the pointer fastened to base. This shows the thermostat arranged for an open circuit, the terminals of the battery-circuit being represented by the wires P' and N' for a closed circuit. The contact and dial screw and terminals are arranged as shown by *c''* *e''* and N'' in dotted lines.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A thermostat having its expansible or heat-indicating portion, or a part thereof, made of rubber or other non-metallic solid, substantially as set forth.

2. A thermostat having its expansible or heat-indicating part made of a bar or tube, acting directly by lineal expansion on the alarm or indicating apparatus, substantially as set forth.

3. The combination of a thermostat, having its expansible or heat-indicating portion, or part thereof, made of rubber or other non-metallic solid with an electrical circuit, substantially as set forth.

4. The combination of a thermostat having its expansible portion, or part thereof, made of rubber or other non-metallic solid, with devices indicating the temperature, substantially as set forth.

5. The combination, with a detent or circuit-controlling device, of a thermostat composed of a bar or tube of one homogenous metal, acting directly thereon by lineal expansion, substantially as set forth.

J. H. GUEST.

Witnesses:
J. FISK,
T. C. CONNOLLY.